

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF :  
YOSHIAKI KOGA , ET AL. :EXAMINER: CALANDRA, ANTHONY J  
SERIAL NO.: 10/591,350 :  
FILED: August 31, 2006 :GROUP ART UNIT: 1791  
FOR: METHOD FOR TREATING :  
PAPERMAKING WASTE WATER, AND  
METHODS OF USING SILICA SOL  
IN PAPERMAKING

DECLARATION UNDER 37 C.F.R. 1,132

COMMISSIONER FOR PATENTS  
P.O. Box 1450  
ALEXANDRIA, VIRGINIA 22313

Sir:

I, Kazuhiko Munemasa, declare the following.

I graduated from the Engineering Department of Okayama University in March, 1989, joined Tokuyama Corporation in April 1989, and was assigned to the division for the manufacture of sodium chemicals. I am one of the inventors of the present invention and very familiar with the technology for treating papermaking waste water by a silica-aluminum based inorganic polymer flocculant (to be referred to as "PASS" hereinafter).

PASS disclosed by CHINA cited in the Office Action differs from PASS used in the present invention. PASS disclosed by CHINA differs from PASS of the present invention in pH due to its manufacturing method. This is described below in detail.

PASS of CHINA

CHINA discloses the following method in 1.2 Preparation of PASS solution as the method of manufacturing PASS. In the method, a predetermined amount of sodium silicate is first diluted to a predetermined concentration, sulfuric acid is

added to the obtained aqueous solution of sodium silicate to adjust its pH, the obtained solution is left for a predetermined time to polymerize silicic acid (after silica sol is produced), a predetermined amount of aluminum sulfate is added, and the resulting product is aged for 2 hours to manufacture PASS.

According to my study, when PASS was manufactured by the method of CHINA, PASS having an acidic pH was not obtained.

When sulfuric acid was added to an alkaline aqueous solution of sodium silicate to reduce the pH of the aqueous solution to 10 or less, silica sol gelled instantly to become an aggregate.

Even when sulfuric acid was added to this aggregate continuously, it did not dissolve the gelled aggregate and acidic silica sol could not be obtained. Therefore, acidic PASS could not be obtained by the method of CHINA.

This is assumed to be due to the property of the silica sol as described in the reference document (see Fig. 2.2.4 at page 42 of "Inorganic Polymer" published by CMC). Silica sol obtained by reacting sodium silicate with sulfuric acid has a high gelation rate at a pH of 7 to 10 as described in the above document. That is, it gels in a short period of time. Therefore, in the manufacturing method of CHINA in which sulfuric acid is added to an alkaline sodium silicate solution, when the pH becomes 10 or less, the silica sol gels to become an aggregate.

The silica-aluminum based inorganic polymer flocculant (PASS) cannot exhibit its effect unless a blend of it in the form of silica sol and aluminum sulfate is added to papermaking waste water.

PASS of CHINA is obtained by adding acidic aluminum sulfate to silica sol. It can be said that PASS of CHINA has a high alkaline pH because it is effectively used to treat papermaking waste water.

## Conclusion

Since the method of manufacturing silica sol in the present invention differs from that of CHINA, the silica-aluminum based inorganic polymer flocculant of the present invention has a pH of 1.5 to 2.5.

As described above, PASS used in the present invention completely differs from PASS of CHINA in pH.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

Further declarant saith not.

Kazuhiko Munemasa  
Signature

November 12, 2008  
Date

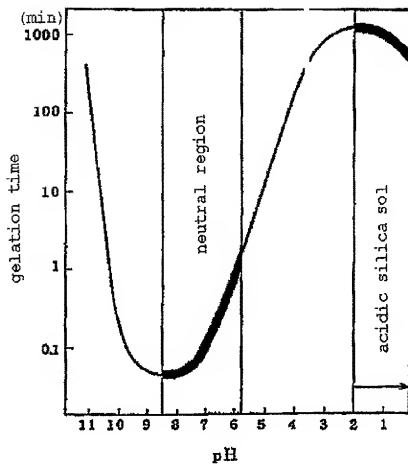


Fig.2.2.4 Relationship between pH of silica sol and gelation time when acid is added to water glass